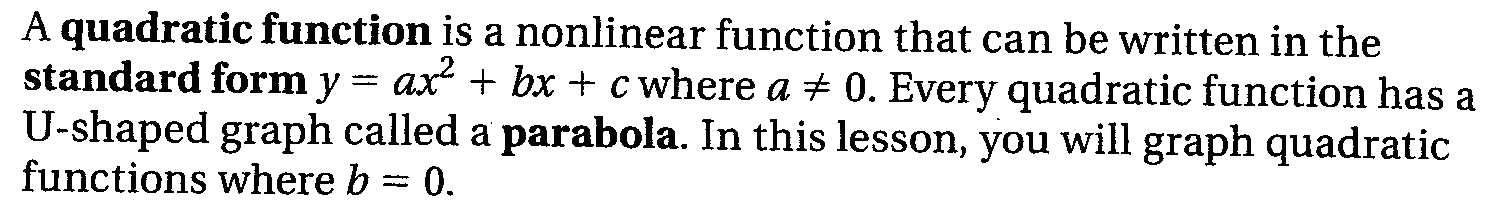
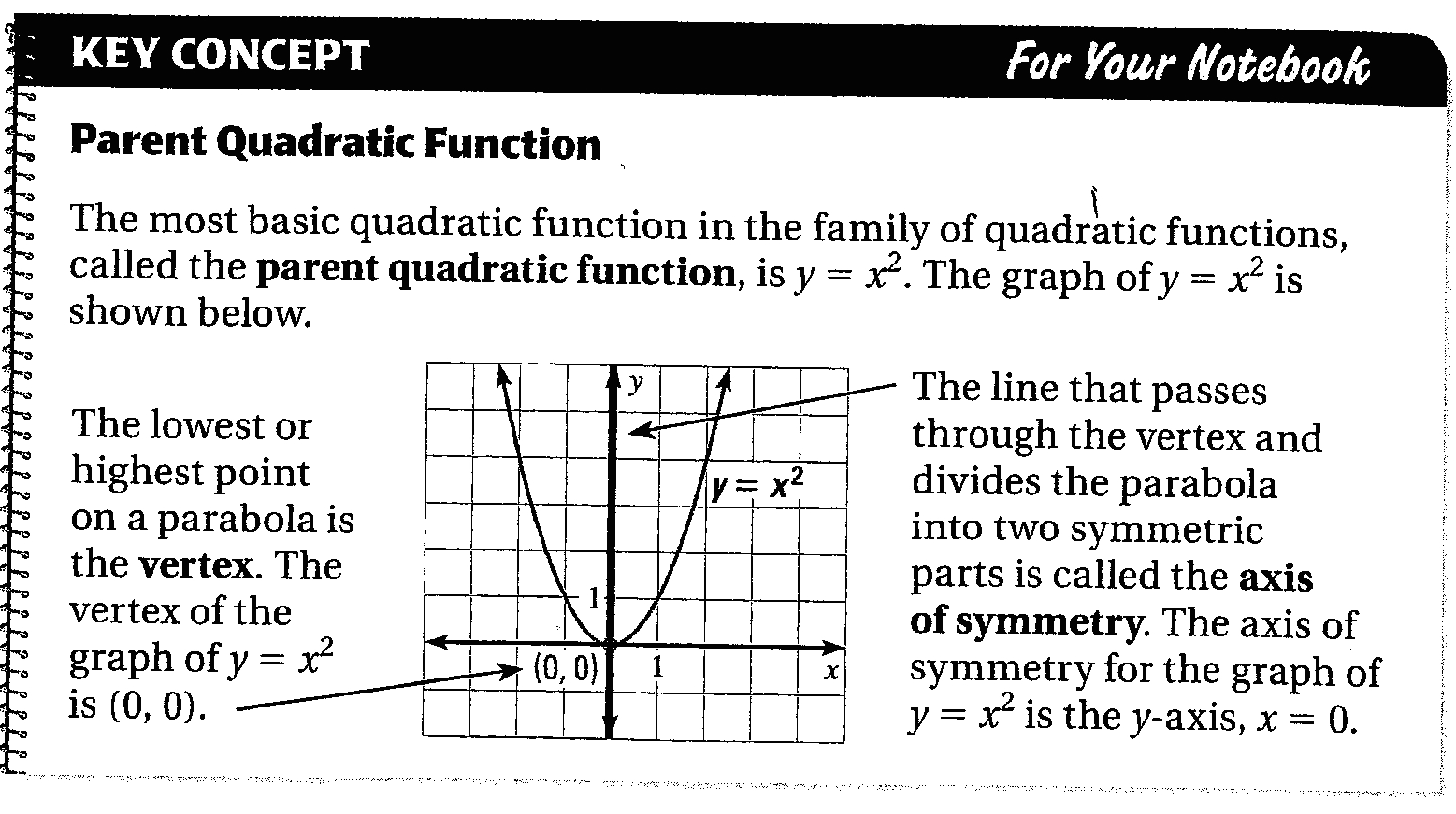
CW100 - QUADRATIC EQUATIONS

**FAILURE TO SHOW ALL WORK IN NOTEBOOK WILL RESULT IN A LASALLE**





**TRANSFORMATIONS**

|  |  |  |
| --- | --- | --- |
| y = **a**x2 + c  when |**a**| > 1  Vertical Stretch  Horizontal Shrink | y = **a**x2 + c  when 0 < |**a**| < 1  Vertical Shrink  Horizontal Stretch | y = **a**x2 + c  when **a** < 0  Reflected across the x-axis  (sad face) |

**TRANSFORMATIONS**

|  |  |
| --- | --- |
| y = ax2 + **c**  when **c** > 0  Vertical Shift Up **c** Units | y = ax2 + **c**  when **c** < 0  Vertical Shift Down **c** units |

**IN YOUR NOTEBOOK**

**VANG THE FOLLOWING QUADRATIC FUNCTION**

**1. y = - x2 – 4**

REQUIRED

VERBAL – axis of symmetry, vertex (max or min), y-intercept, x-intercept(s)

ANALYTICAL – axis of symmetry, vertex, y-intercept, x-intercepts(s)

NUMERICAL – At least 5 points, label vertex, y-intercept, x intercept

GRAPHICAL – label axis of symmetry, vertex (max or min), y-intercept, x-intercept(s)

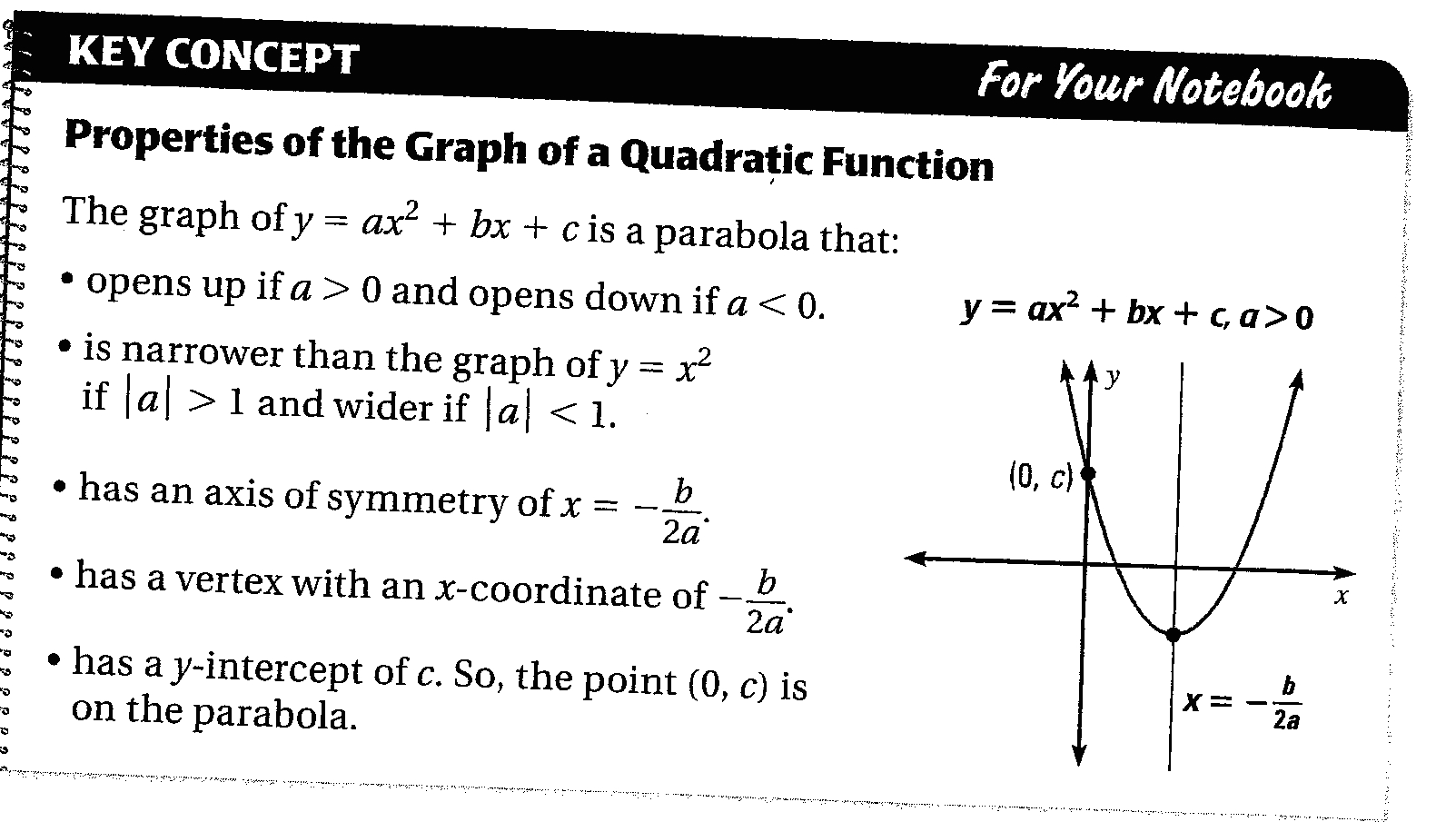
**IN YOUR NOTEBOOK**

**DESCRIBE THE TRANSFORMATIONS TO THE PARENT FUNCTION IN EACH EQUATION**

**2.**

**3.**

**4. DESCRIBE THE TRANSFORMATION IF WERE CHANGED TO**



**IN YOUR NOTEBOOK**

**VANG THE FOLLOWING QUADRATIC FUNCTION**

**5. y = -2x2 + 12x – 10**

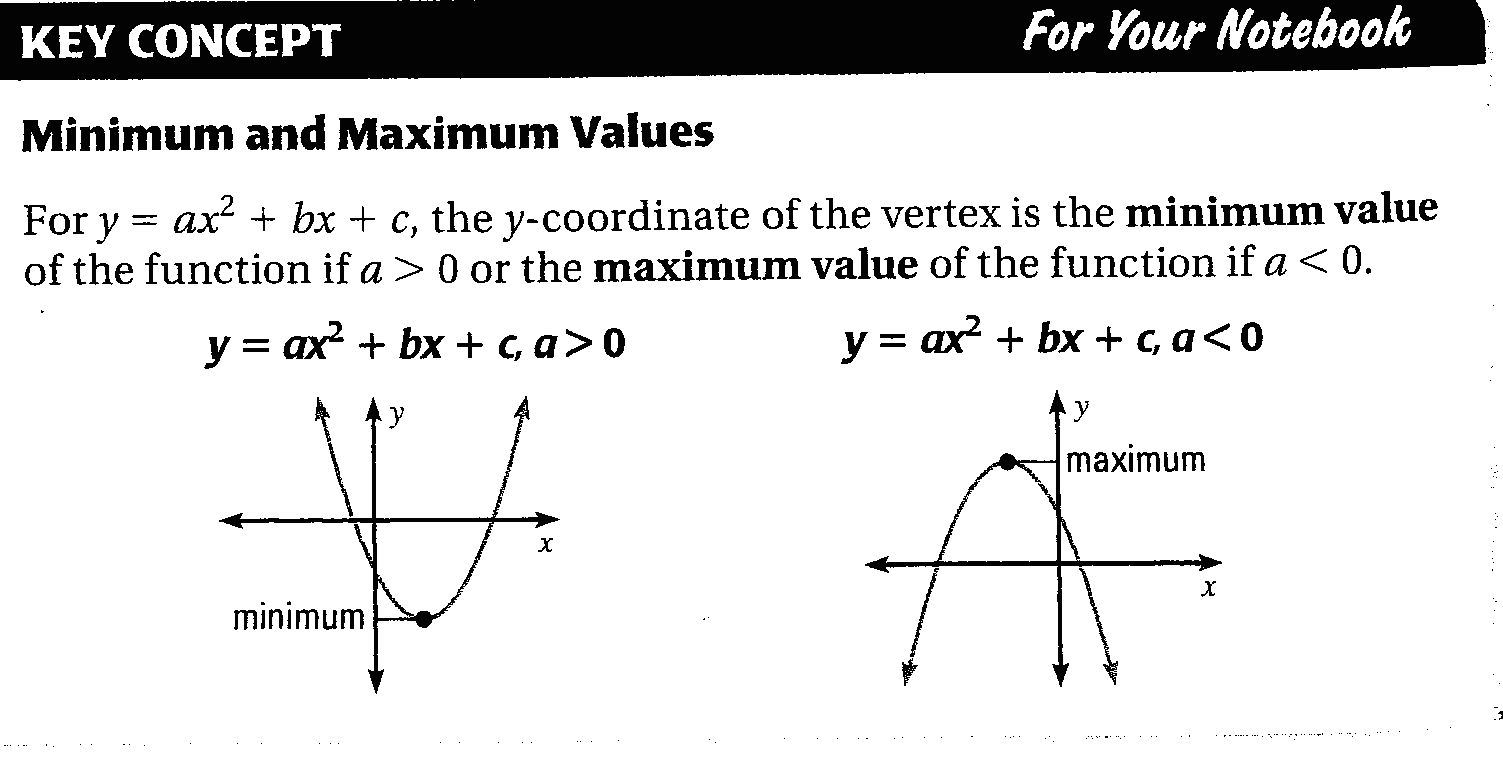
REQUIRED

VERBAL – axis of symmetry, vertex (max or min), y-intercept, x-intercept(s)

ANALYTICAL – axis of symmetry, vertex, y-intercept, x-intercepts(s)

NUMERICAL – At least 5 points, label vertex, y-intercept, x intercept

GRAPHICAL – label axis of symmetry, vertex (max or min), y-intercept, x-intercept(s)



|  |
| --- |
| **EXAMPLE – Finding the maximum or minimum value of a quadratic function**  **Write if the function y = 2x2 + 8x +4 has a maximum or minimum value and solve for the maximum or minimum value.**  **Solution**  Because **a = 2** and 2 >0, the parabola opens up and the function has a minimum value. To find the minimum value, find the **vertex**.  x = = = = - 2 **The x-coordinate is**  f(x) = f(-2) = 2(-2)2 + 8(-2) + 4 = 8 – 16 + 4 = - 4 **Substitute - 2 for x. Then simplify.**  **The parabola opens up and the function has a minimum value. The minimum value of the**  **function is f (-2) = - 4.** |

**IN YOUR NOTEBOOK**

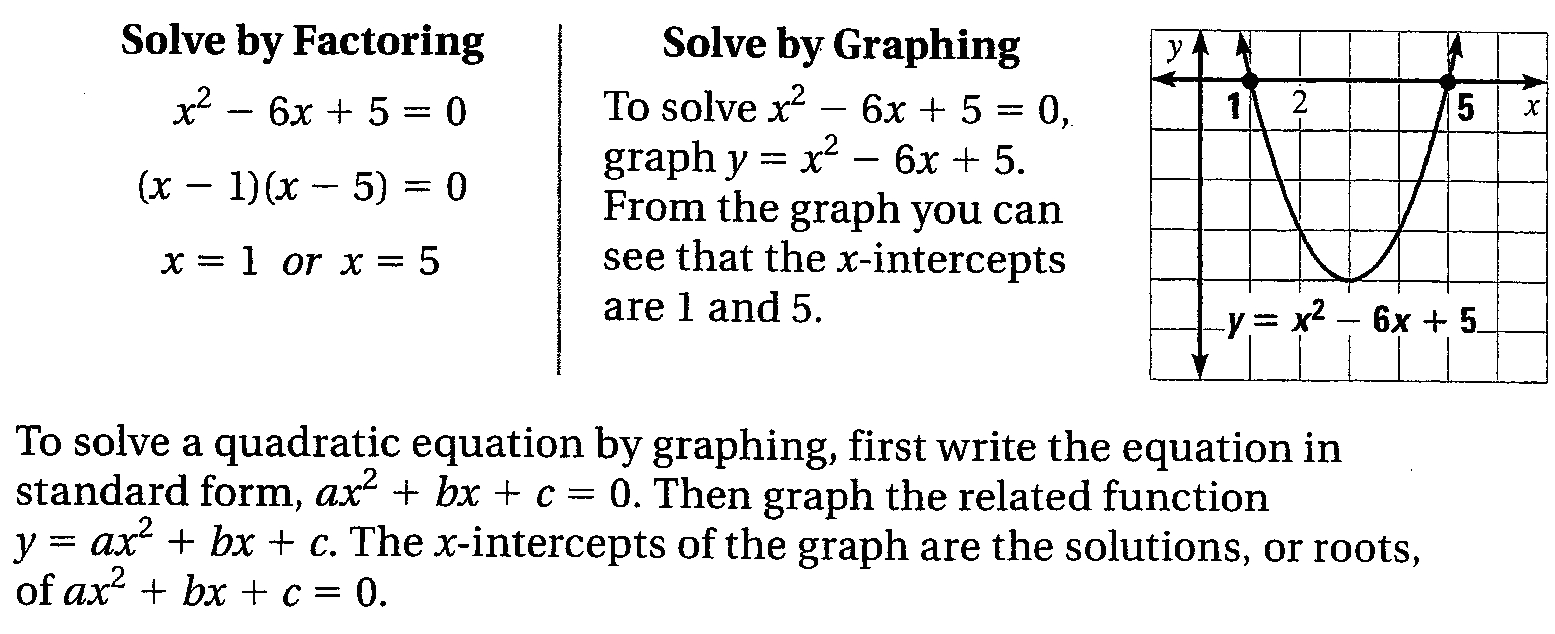
**WRITE IF THE FUNCTION HAS A MAXIMUM OR A MINIMUM VALUE AND SOLVE FOR THE MAXIMUM OR MINIMUM VALUE.**

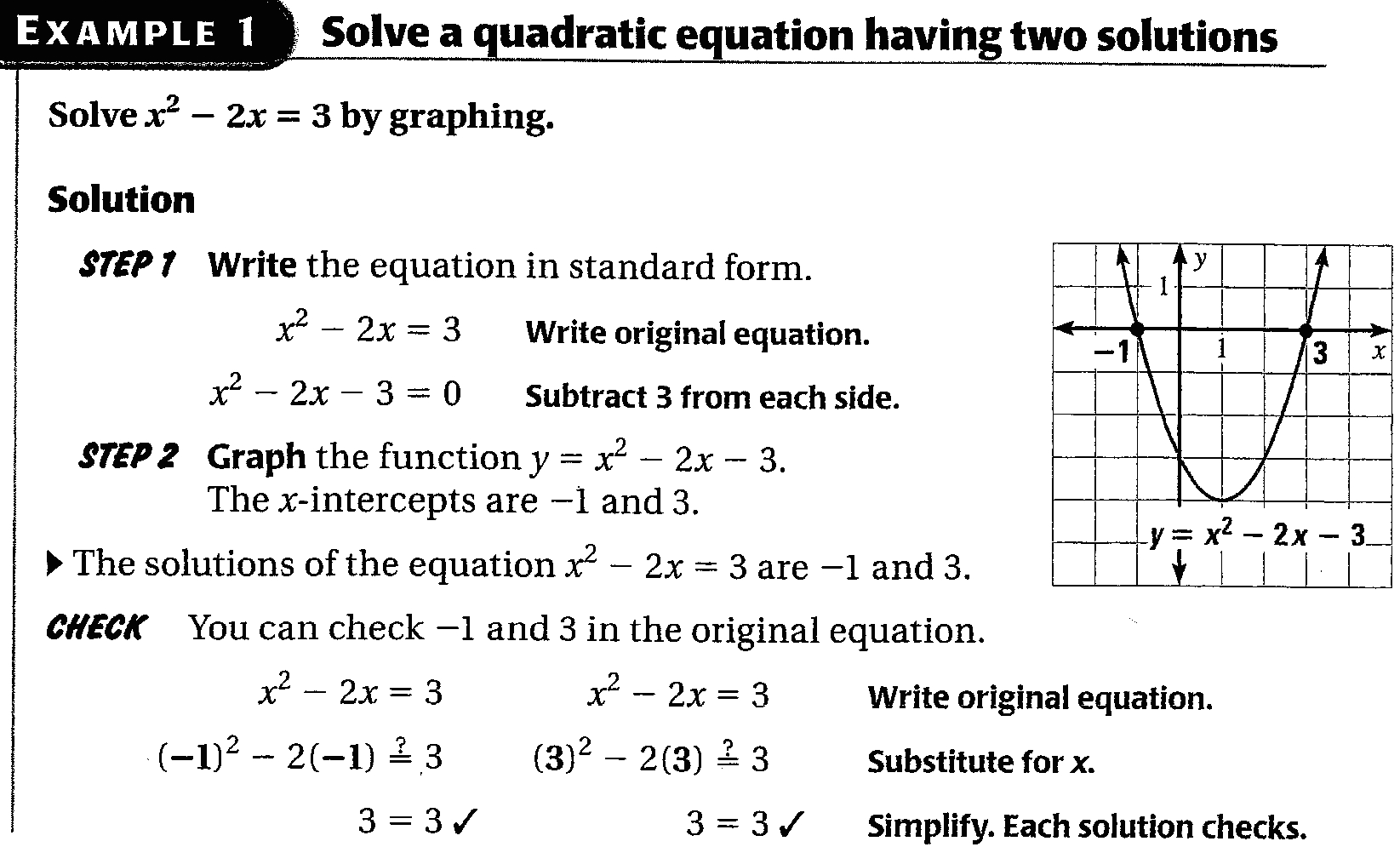
**6. y = -3x2 – 12x + 10**

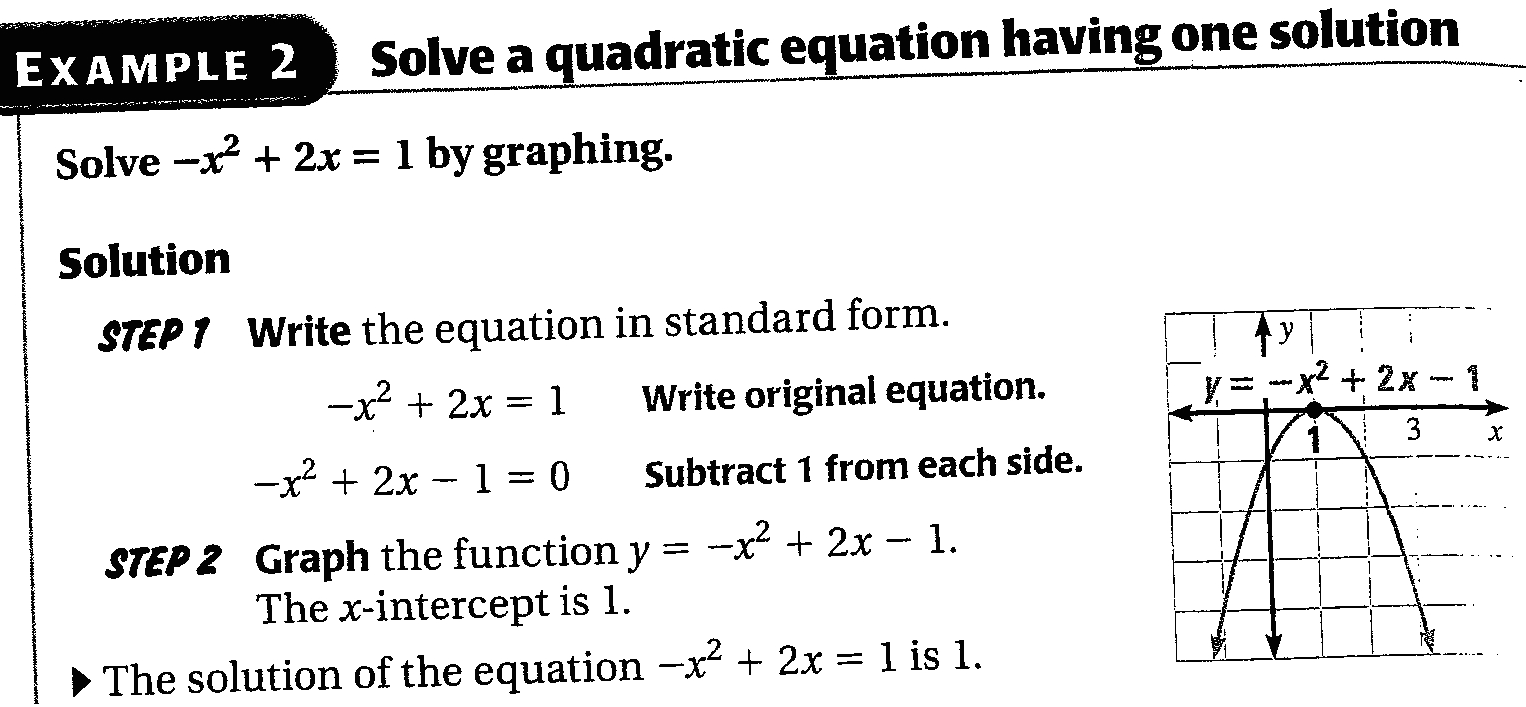
**7. y = 6x2 + 18x + 13**

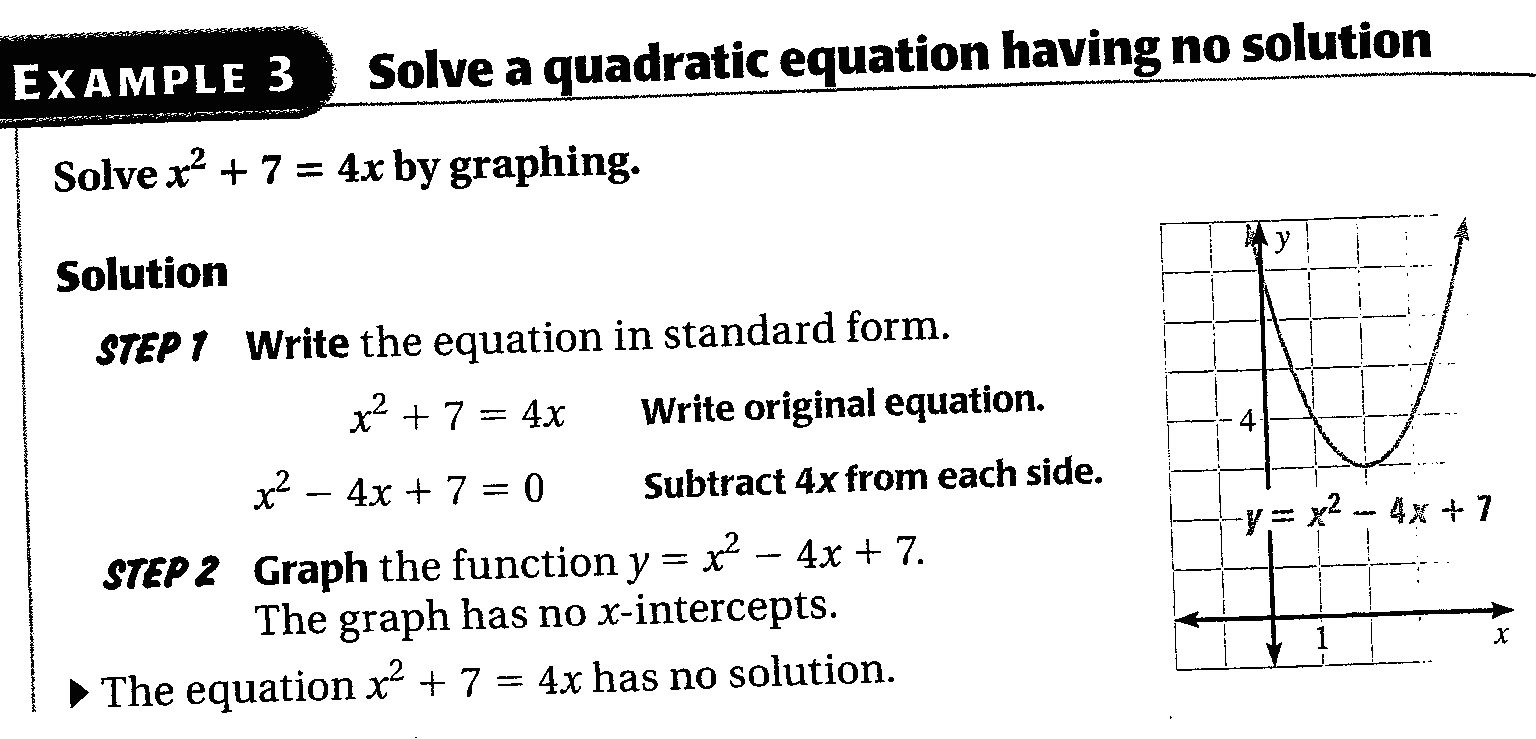
**How do we solve quadratic equations by graphing?**

When solving a quadratic equation, the solutions are called the “roots”, “zeroes” or “solutions”. The solutions are simply the x-intercepts of the quadratic equation. It is possible to have 2, 1, or 0 solutions, depending on where or if your parabola crosses the x-axis. See the examples below.









**IN YOUR NOTEBOOK**

**8.** **VANG THE FOLLOWING QUADRATIC FUNCTION**

y = x2 - 6x + 8

REQUIRED

VERBAL – axis of symmetry, vertex (max or min), y-intercept, x-intercept(s)

ANALYTICAL – axis of symmetry, vertex, y-intercept, x-intercepts(s) (factor)

NUMERICAL – At least 5 points, label vertex, y-intercept, x intercept

GRAPHICAL – label axis of symmetry, vertex (max or min), y-intercept, x-intercept(s)

**9. FIND THE SOLUTIONS BY GRAPHING THE FOLLOWING EQUATIONS AND SKETCH THE GRAPH**

1. x2 + x = -1
2. -x2 + 6x = 9

**TWO WAYS TO FIND THE SOLUTIONS (X-INTERCEPTS) WITH YOUR GRAPHING CALCULATOR**

USING THE TABLE

* Get to the TABLE by pressing 2ND then GRAPH
* Scroll down the table by using the up and down arrow keys
* Easier method but does not always display the x-intercepts

FINDING THE ZEROES

* Get to CALC by pressing 2ND then TRACE , then press 2 (Zeroes)
* You place the cursor to the left of an x-intercept in LEFT BOUND, HIT ENTER
* You place the cursor to the right of the same x-intercept in RIGHT BOUND, HIT ENTER
* You place the cursor as close to the x-intercept as you can, HIT ENTER